



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Wu et al.

Attorney Docket No.:
NOVLP094/NVLS-2919

Application No.: 10/789,103

Examiner: Bret Chen

Filed: February 27, 2004

Group: 1762

Title: METHODS FOR PRODUCING LOW-K
CDO FILMS WITH LOW RESIDUAL STRESS

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as first-class mail on March 27, 2006 in an envelope addressed to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450.

Signed: _____

Tara Hayden

**INFORMATION DISCLOSURE STATEMENT
BEFORE FINAL ACTION OR NOTICE OF ALLOWANCE
(37 CFR §§ 1.56 AND 1.97(c))**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The references listed in the attached PTO Form 1449, a copy of which is attached, may be material to examination of the above-identified patent application. Applicants submit this reference in compliance with their duty of disclosure pursuant to 37 CFR §§ 1.56 and 1.97. The Examiner is requested to make this citation of official record in this application.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that this reference indeed constitutes prior art.

This Information Disclosure Statement is being filed after the mailing date of the first Office Action on the merits, or after three months of the filing date of this application, whichever event occurred last, but it is believed before the mailing date of either: (i) a final action under § 1.113 or (ii) a notice of allowance under § 1.311, whichever occurs first.

04/03/2006 SSESHE1 00000026 500388 10789103

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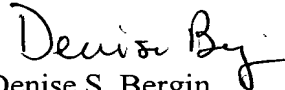
Accompanying this Information Disclosure Statement is

- ☐ a statement as specified in 37 CFR 1.97(e); or
- ☒ the fee set forth in 37 CFR 1.17(p).

The Commissioner is hereby authorized to charge \$180.00 and any other additional fees to Deposit Account 500388 (Order No. NOVLP094).

Respectfully submitted,

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Form 1449 (Modified) Information Disclosure Statement By Applicant (Use Several Sheets if Necessary)	Atty Docket No. NOVLP094	Application No.: 10/789,103
	Applicant: Wu et al. Filing Date 02-27-2004	Group 1762

U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
	A	6,340,628	1/22/02	Van Cleemput, et al.	438	586	12/12/00
	B	6,383,955	5/7/02	Matsuki, et al.	438	790	6/7/99
	C						
	D						
	E						
	F						
	G						
	H						
	I						

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Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
	J							

Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	K	Jan, C.H., et al, <i>90NM Generation, 300mm Wafer Low k ILD/Cu Interconnect Technology</i> , 2003 IEEE Interconnect Technology Conference.
	L	U.S. Application No. 10/820,525 (Atty Docket No.: NOVLP091), entitled: METHODS FOR PRODUCING LOW-K CDO FILMS WITH LOW RESIDUAL STRESS, Wu et al.
	M	U.S. Application No. 10/800,409 (Atty Docket No.: NOVLP098), entitled: METHODS FOR PRODUCING LOW-K CDO FILMS, Wu et al.
Examiner		Date Considered

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



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	A1	6,329,017	12.11.01	Liu et al.			
	A2	6,383,466	05.07.02	Domansky et al.			
	A3	6,365,266	04.02.02	MacDougall et al.			
	A4	5,504,042	04.02.96	Cho et al.			
	A5	5,858,457	01.12.96	Brinker et al.			
	A6	6,270,846	08.07.01	Brinker et al.			
	A7	6,387,453	05.14.02	Brinker et al.			
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	A14	4,885,262	12.05.89	Ting et al.			
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	A34	2002/0001973	01.03.02	Wu et al.			
Examiner				Date Considered			

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	A37	6,268,276	07.31.01	Chan et al.			
	A38	6,177,329	01.23.01	Pang			
	A39	5,920,790	07.1999	Wetzel et al.			
	A40	2003/0119307	06.2003	Bekiaris et al.			
	A41	6,596,467	07.22.03	Gallagher et al.			
	A42	6,667,147	12.23.03	Gallagher et al.			
	A43	6,312,793	11.06.01	Grill et al.			
	A44	6,576,345	06.10.03	Cleemput et al.			
	A45	6,677,251	01.2004	Lu et al.			
	A46	6,812,043	11.2004	Bao et al.			
	A47	6,831,284	12.2004	Demos et al.			
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	A49	2003/0064607	04.2003	Leu et al.			
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	A51	6,756,085	06.29.04	Waldfried et al.			

Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
	B1	WO95/07543	03.16.95	WIPO			X	
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Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	C1	Cho et al., "Plasma Treatments of Molecularly Templated Nanoporous Silica Films," Electrochemical and Solid-State Letters, 4 (4) G35-G38 (2001)
	C2	Yung et al., "Spin-on Mesoporous Silica Films with Ultralow Dielectric Constants, Ordered Pore Structures, and Hydrophobic Surfaces," Adv. Mater. 2001, 13, No. 14, 1099-1102
	C3	Schulberg et al., "System for Deposition of Mesoporous Materials," U.S. Patent Application No. 10/295,965, filed November 15, 2002, 64 Pages
	C4	Watkins et al., "Mesoporous Materials and Methods," U.S. Patent Application No.10/301,013, filed November 21, 2002, 34 Pages
	C5	Justin F. Gaynor, "In-Situ Treatment of Low-K Films With a Silylating Agent After Exposure To Oxidizing Environments," U.S. Patent Application No.10/056,926 filed January 24, 2002, 34 Pages
	C6	Humayun et al., "Method for Forming Porous Films By Porogen Removal Combined With In SITU Surface Modification", Novellus Corporation, Application No. 10/404,693, filed 3/31/03, pages 1-32. Atty. Docket No. NOVLP064/NVLS-0007
	C7	Tipton et al., "Method Of Porogen Removal From Porous Low-K Films Using UV Radiation", Novellus Systems, Inc., Application No. 10/672,311, filed 9/26/03, pages 1-27. Atty. Docket No. NOVLP075/NVLS-000820
	C8	U.S. Patent Application No. 10/016,017, File Date: December 12, 2001 (Atty Dkt: NOVLP030)
	C9	U.S. Patent Application No. 10/125,614, File Date: April 18, 2002 (Atty Dkt: NOVLP028)
	C10	U.S. Patent Application No. 10/202,987, File Date: July 23, 2002 (Atty Dkt: NOVLP028X1)
	C11	Tipton et al., "Method for Removal of Porogens From Porous Low-K Films Using Supercritical Fluids", Novellus Systems, Inc., Application No. 10/672,305, filed 9/26/03, pages 1-32. Atty. Docket No. NOVLP069/NVLS-000821
	C12	Gangpadhyay et al., "The First International Surface Cleaning Workshop," Northeastern University, November 11-14, 2002
	C13	Cho et al., "Method and Apparatus for UV Exposure of Low Dielectric Constant Materials for Porogen Removal and Improved Mechanical Properties", Novellus Systems, Inc., Application No. 10/800,377, filed 3/11/04, pages 1-31. Atty. Docket No. NOVLP089/NVLS-2887
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	C14	Wu et al., "Method and Apparatus of UV Exposure of Low Dielectric Constant Materials for Porogen Removal and Improved Mechanical Properties", Novellus Systems, Inc., Application No. 10/807,680, filed 3/23/04, pages 1-34. Atty. Docket No. NOVLP097/NVLS-2906
	C15	Humayun et al., "Method For Forming Porous Films By Porogen Removal Combined With In Situ Modification", U.S. Patent No. 10/404,693, filed March 31, 2003, Office Action dated March 15, 2005 (Atty Dkt: NOVLP064)
	C16	Tipton et al., "Method Of Porogen Removal From Porous Low-K Films Using UV Radiation", U.S. Application No. 10/672,311, filed September 26, 2003, Office Action dated September 7, 2004 (Atty Dkt: NOVLP075/NVLS-000820)
	C17	Tipton et al., "Method Of Porogen Removal From Porous Low-K Films Using UV Radiation", U.S. Application No. 10/672,311, filed September 26, 2003, Office Action dated December 28, 2004 (Atty Dkt: NOVLP075/NVLS-000820)
	C18	Tipton et al., "Method For Removal Of Porogens From Porous Low-K Films Using Supercritical Fluids", U.S. Patent No. 10/672,305, Office Action dated March 22, 2005 (Atty Dkt: NOVLP069).
	C19	Bandyopadhyay et al., "Method to Improve Mechanical Strength of Low-K Dielectric Film Using Modulated UV Exposure", U.S. Patent Application No. 10/825,888, filed April 16, 2004 (Atty Dkt: NOVLP088US/NVLS-2882)
	C20	R.D. Miller et al., "Phase-Separated Inorganic-Organic Hybrids for Microelectronic Applications," MRS Bulletin, October 1997, Pages 44-48
	C21	Jin et al., "Nanoporous Silica as an Ultralow-k Dielectric," MRS Bulletin, October 1997, Pages 39-42
	C22	Asoh et al., "Fabrication of Ideally Ordered Anodic Porous Alumina with 63 nm Hole Periodicity Using Sulfuric Acid," J. Vac. Sci. Technol. B 19(2), Mar/Apr 2001, Pages 569-572
	C23	Asoh et al., "Conditions for Fabrication of Ideally Ordered Anodic Porous Alumina Using Pretextured Al," Journal of the Electrochemical Society, 148 (4) B152-B156 (2001) Pages B152-B156
	C24	Holland et al., "Nonlithographic Technique for the Production of Large Area High Density Gridded Field Sources," J. Vac. Sci. Technol. B 17(2), Mar/Apr. 1999, Pages 580-582
	C25	Masuda et al. "Highly Ordered Nanochannel-Array Architecture in Anodic Alumina," App. Phys. Lett. 71(19), November 1997, Pages 2770-2772
	C26	Clube et al., "White Paper from Holotronic Technologies SA; downloaded from www.hdotronic.com/whitepaper/fine-patt.pdf on March 12, 2002
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	C29	Meli et al., "Self-Assembled Masks for the Transfer of Nanometer-Scale Patterns into Surfaces: Characterization by AFM and LFM", Nano Letters, Vol. 2, No. 2, 2002, 131-135
	C30	"Shipley Claims Porous Low K Dielectric Breakthrough," Press Release March 17, 2003.
	C31	Jeffrey M. Calvert and Michael K. Gallagher, Semiconductor International, 26 (12), 56 (2003).
	C32	Van Bavel et al., Future Fab International, 16, (2004).
	C33	Caluwaerts et al, "Post Patterning Meso Porosity Creation: A Potential Solution For Pore Sealing," IITC 2003.
	C34	Peter Singer, "New Materials and Designs to Improve Transistor Performance", April 1, 2004, Semiconductor International.
	C35	Ghani et al, "A 90nm High Volume Manufacturing Logic Technology Featuring Novel 45nm Gate Length Strained Silicon CMOS Transistors", IEEE, © 2003.
	C36	Bhadri N. Varadarajan, "Tensile Silicon Nitride – P1264 NESL", C & F Study, August 21, 2003.
	C37	Varadarajan, et al., "Strained Transistor Architecture and Method", Novellus Systems, Inc., Appln No. 10/923,259, filed August 20,2004, pages 1-24. [Atty Docket No. NOVLP108/NVLS-2933].
	C38	Niu et al., "Methods For Improving The Cracking Resistance Of Low-K Dielectric Materials", U.S. Application No. 10/860,340, filed June 2, 2004, (Atty Dkt: NOVLP099)
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	C40	Niu et al., "Methods For Improving The Cracking Resistance Of Low-K Dielectric Materials", U.S. Application No. 10/860,340, Final Office Action dated June 13, 2005, (Atty Dkt: NOVLP099)
	C41	Wang et al., "Plasma Detemplating And Silanol Capping Of Porous Dielectric Films", U.S. Application No. 10/785,235, filed February 23, 2004 (Atty Dkt: NOVLP085)
	C42	Varadarajan et al., "Tensile Dielectric Films Using UV Curing", U.S. Application No. 10/972,084, filed October 22, 2004 (Atty Dkt: NOVLP122)
	C43	Fox et al., "Method For Improving Mechanical Properties Of Low Dielectric Constant Materials", U.S. Application No. 10/849,568, filed May 18, 2004 (Atty Dkt: NOVLP083)
Examiner		Date Considered

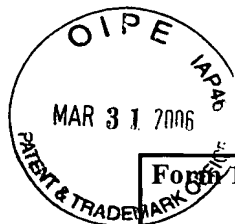
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Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	C44	Fox et al., "Methods For Producing Low-Stress Carbon-Doped Oxide Films With Improved Integration Properties", U.S. Application No. 10/987,208, filed November 12, 2004 (Atty Dkt: NOVLP104)
	C45	Van Den Hoek et al., "VLSI Fabrication Processes For Introducing Pores Into Dielectric Materials," U.S. Application No. 11/050,621, filed January 31, 2005 (Atty Dkt: NOVLP100)
	C46	Draeger et al., "Creation Of Porosity In Low-K Films By Photo-Disassociation Of Imbedded Nanoparticles," U.S. Application No. 11/146,456, filed June 6, 2005 (Atty Dkt: NOVLP100X1)
	C47	Wu et al., "Methods For Producing Low Stress Porous Low-K Dielectric Materials Using Precursors With Organic Functional Groups", U.S. Application No. 10/927,777, filed August 27, 2004 (Atty Dkt: NOVLP106)
	C48	Wu et al., "Methods For Improving Integration Performance Of Low Stress CDO Films", U.S. Application No. 10/941,502, filed September 14, 2004 (Atty Dkt: NOVLP107)
	C49	Cho et al., "Methods of Improving Porogen Removal and Film Mechanical Strength in Producing Ultra Low-K Carbon Doped Oxide Films Using Radical Photopolymerization", U.S. Application No. 10/982,654, filed November 5, 2004 (Atty Dkt: NOVLP115)
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U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
	A1	6,500,770 B1	12.2002	Cheng et al.			
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Other Documents

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	C1	U.S. Office Action mailed July 13, 2005, from U.S Application No. 10/672,311 [Atty Dkt No. NOVLP075/NVLS-000820].
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	C1	U.S. Office Action mailed August 24, 2005, from U.S Application No. 10/404,693 [Atty Dkt No. NOVLP064/NVLS-794].
	C2	U.S. Office Action mailed September 1, 2005, from U.S Application No. 10/672,305 [Atty Dkt No. NOVLP069/NVLS-000821].
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	C1	U.S. Office Action mailed December 23, 2005, from U.S Application No. 10/800,409 [Atty Dkt No. NOVLP098/NVLS-002907].
	C2	U.S. Office Action mailed February 7, 2006, from U.S Application No. 10/672,305 [Atty Dkt No. NOVLP069/NVLS-000821].
	C3	U.S. Office Action mailed December 20, 2005, from U.S Application No. 10/672,311 [Atty Dkt No. NOVLP075/NVLS-000820].
	C4	U.S. Office Action mailed December 20, 2005, from U.S Application No. 10/849,568 [Atty Dkt No. NOVLP083/NVLS-2867].
	C5	U.S. Office Action mailed January 9, 2006, from U.S Application No. 10/785,235 [Atty Dkt No. NOVLP085/NVLS-2875].
	C6	U.S. Office Action mailed February 28, 2006, from U.S Application No. 10/404,693 [Atty Dkt No. NOVLP064/NVLS-794].
	C7	Subramonium et al., "Pulsed PECVD Method for Modulating Hydrogen Content in Hard Mask", U.S. Application No. 11/318,269, filed December 23, 2005 (Atty Dkt: NOVLP144/NVLS-3102)
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